UTILIZATION OF NASA-GENERATED SPACE TECHNOLOGY BY
MIDWESTERN INDUSTRY

30p.

N63 18316
Code-1

QUARTERLY PROGRESS REPORT NO. 3
5 May - 5 August 1962

Task Order Contract No. NASr-63(03)

M.R.I. Project No. 2563-M

OTS PRICE

XEROX $ [redacted]

MICROFILM $ [redacted]

For

Office of Applications
Code FF
National Aeronautics and Space Administration
Washington 25, D. C.

576 800

MRI

MIDWEST RESEARCH INSTITUTE

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UTILIZATION OF NASA-GENERATED SPACE TECHNOLOGY BY MIDWESTERN INDUSTRY

by

H. M. Gadberry

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I. INTRODUCTION

This report covers the progress on Contract NASr-63(03) during the third quarter, 5 May to 5 August 1962. The preceding report summarized the principal findings of this project up to the time of the review meeting held at NASA Headquarters on 26 June 1962. Therefore, the present report will be confined to a brief summary of project activities and accomplishments since 15 June 1962.

Project Activities

Meetings: The regional ASTRA meetings have been curtailed during the summer, in order to devote time to other aspects of the project. ASTRA meetings will be held throughout the remaining half of the six-state area this fall, starting with the meeting in Topeka, Kansas, on 5 September 1962.

Follow-up: Personal follow-up calls to those firms attending ASTRA meetings, comprised the major activity during this period. At the time of the preceding report, we had visited 34 companies to learn firsthand their capabilities and technical problems, and to suggest specific space-related ideas which we thought would be useful to them.

In this report period 106 additional follow-up calls have been made in Wichita, Joplin and Oklahoma City, bringing the cumulative total to 140 firms. A contact report is written for each firm visited, indicating the main topics of interest and showing our evaluation of the firm as a potential user of NASA technology. Appendix A shows eight such reports, more or less typical of the response obtained in these calls.

These follow-up efforts, like the original ASTRA meetings with industry, were reported by local newspapers in each locale. Appendix B contains news reports from Joplin, Carthage, Oklahoma City and Norman.

Inquiries: As a direct result of these individual calls on area firms, ASTRA has received additional inquiries concerning 275 space related ideas. Table I shows the distribution of these requests.

TABLE I

	Wichita	Joplin	Oklahoma City	Third Quarter Total
F.E.P. Release Coatings	7	1	3	11
Sintered Alumina Ceramics		1		1
Printed Cables	2	1		3
Air Bearings	2	1	1	4
Cold Galvanize Paints	5	3	10	18
Nucleated Glass (Pyroceram-Nucerite)		1		1
NRC-2 Aluminized Mylar Insulation	1	1		2
Reliable Soldering Techniques	1	1	2	4
Rechargeable Sealed Batteries		1	2	3
Pert and Pert/Cost	10	1	9	20
Special High Pressure A/N Connectors	1	1	1	3
High Temp Paints	1	2	4	7
Magnetic Metal Forming	6	3	7	16
3-Blade Change-Can Mixer			1	1
Non-Tip Life Raft	3			3
Automatic Retaining Collar			1	1
Beryllia Heat Sink Ceramic		1	1	2
Ballistocardiograph		1		1

TABLE I (Continued

	Wichita	Joplin	Oklahoma City	Third Quarter Total
Pressure Transducing Coatings	2		4	6
Magnetic Reed Switches			1	1
Video Tape Recorder	1		1	2
Impact Protection for Shipping Electronics	1		2	3
Welding Seam Tracker	1		1	2
Stirred Arc Heater			1	1
Klimp	1			1
Frangible Tube (Energy Dissipator)	5		3	8
Welding Technique	8		5	13
Liquid Level Sensor with Servo F.B.			1	1
Thermally Insulating Fabrics	2	1	1	4
Teflon Insulated Ribbon Cable	2			2
Rubber Chain Drive System		1		1
Butterfly Valve with Inflatable Seals	1	1		2
High Temp Nickel Base Alloy	1	1		2
Explosive Metalworking	2	2	1	5
Foam Insulation for Steel Structures	2	1	3	6
Superior Cleaning Techniques			3	3
Adhesive Bonding of Mechanical Elements	1	1	1	3

TABLE I (Continued)

	Wichita	Joplin	Oklahoma City	Third Quarter Total
Vibration Isolation Mountings	1	2	2	5
Ion Discharge Ozone Generator		1		1
Current Limit Automatic Circuit Breaker		1		1
Kudl Pak			1	1
Ultrasonic Cleaning			4	4
Hydraulic Fluid Filtering	2	1		3
Miniature Connectors		2	1	3
Honeycomb Structure			3	3
Floating Fastener	1		4	5
Epoxy Battery Case	2	1		3
Life Vest	2			2
Physiological Sensor	1			1
Paper Thickness Sensor		1		1
Astronauts Space Survival Kit		1	2	3
Teflon Technique		1	1	2
Patent List	8	5	11	24
Electronic/Electric	3	2	3	8
Fiber Glass Backup Tape	3	3	3	9

TABLE I (Concluded)

	Wichita	Joplin	Oklahoma City	Third Quarter Total
Thin Shell Investment Castings			1	1
Teaching Methods and Machines		1	1	2
Phase Lock			1	1
Parametric Amplifier			1	1
Relay Reliability Standard (Huntsville)	1	2	4	7
Temperature Indicating Coatings	7	1	3	11
Pyrotechnic Clipper	1	1	1	3
Fabrics	1	2	1	4
Total				275

Case histories of acceptance by industry: Some of this effort is paying off in terms of use by manufacturers of the ideas provided by ASTRA.

To our best knowledge at this time, 18 firms out of the 140 that have been called on have taken action to put space-derived concepts into commercial use. There are probably other cases unknown to us.

We believe that these cases of utilization will be of interest to the applications officers at NASA centers, and to others trying to determine how NASA know-how can be used to strengthen industry. Hence a brief history of each case will be given. These reports have not yet been cleared with the firms concerned. Therefore, we believe that their names should not be publically disclosed.

John Deere Company, Ottumwa, Iowa: In the production of farm machinery, this firm must machine the edges of two channel pieces before they can be welded into a box beam on an automatic welder. A representative of John Deere

visited M.R.I. to learn whether the weld seam tracker (developed at the Marshall Space Flight Center) would eliminate the necessity of machining on these parts. Subsequently, he visited Marshall to obtain detailed information on their seam tracker. The firm is currently seeking a commercial version of this device.

J. F. Pritchard and Company, Kansas City, Missouri: Immediately after the ASTRA meeting in Kansas City, the J. F. Pritchard Company, one of the nation's leading producers of industrial cooling towers, requested information about an inactivated patent case covering a system for cleaning cooling towers. This system uses no electric power and is ideal for remotely located, atmospheric towers. It also promises economies of installation and operation for regular industrial use.

M.R.I. provided Pritchard with a copy of the patent application and made arrangements for the Pritchard Company to get in direct touch with the inventor at the Langley Research Center. A newly revised application incorporating new claims has been prepared by the inventor for submission to the patent office.

The Pritchard Company is evaluating this cleaning system for possible use in their line of cooling towers.

Bendix Aviation Company, Kansas City, Missouri: As an A. E. C. prime contractor, Bendix produces electrical and electronic circuitry, meeting the highest standards of reliability. On learning from M.R.I. of the special NASA course and handbook on Reliable Soldered Connections, Bendix requested 48 copies of the manual which the Marshall Center supplied. M.R.I. suggested that Bendix could best obtain full benefit of NASA's experience by sending one of their production supervisors to the NASA training school. Through the cooperation of the Quality Assurance Division at Marshall, Bendix will send one man to the school during October.

Omtronics, Inc., Omaha, Nebraska: In the production of miniature precision wire-wound resistors, Omtronics was encountering about 25 per cent breakage of the small steatite ceramic rods when the terminal caps were pressed on the ends. M.R.I. suggested the use of stronger ceramics and requested the advice of Lewis Research Center. Following these suggestions, Omtronics has successfully located a commercial source of a 95 per cent alumina rod and tell us that "breakage has ceased to be a problem."

Cessna Aircraft Company, Wichita, Kansas: Cessna expressed considerable interest in the frangible tube energy absorber for possible use on one

of their helicopters. In this application, it would serve as an emergency overload shock absorber to prevent damage to the airframe in the event of a hard, auto-rotation landing.

M.R.I. supplied Cessna with complete information on the frangible tube, including a copy of NASA's TN-D975. Cessna engineers are making a design study to evaluate the concept for possible inclusion in the landing gear structure of their new helicopter.

Aero Commander Company, Bethany, Oklahoma: This firm produces jet aircraft for private use. Up to the present all structural elements have been of conventional aircraft aluminum alloys. For the new Commander design they wished to employ titanium in certain critical parts, and needed to obtain up-to-date information on the selection of alloys and the best shaping, drawing and forming processes. M.R.I. had told them about McDonnell Aircraft's successful use of heated ceramic dies for "Creep Forming" of double curved titanium sections on the Mercury capsules. For further production know-how, M.R.I. arranged for Mr. Leslie Jennings, Sr. of Aero Commander to spend one day at the Defense Metals Information Center and to receive special information from Titanium Metals Corporation.

Moore Hat Company, Lawton, Oklahoma: In the production of men's hats, Moore employs a phenolic impregnated stiffener which is heat set in the final hat blocking operation. Sticking of the phenolic resin to the aluminum heater blocks was a frequent occurrence, sometimes resulting in tearing of the finished hat.

Although invited to the Oklahoma City ASTRA meeting, representatives of Moore were unable to attend. However, the president of the First National Bank of Lawton was there and he knew of Moore's production troubles. He telephoned M.R.I. and asked whether the F.E.P. Release Coating found to be useful in curing solid propellants might prevent the sticking problem. M.R.I. furnished technical information on the properties and application procedures needed, and also suggested several custom coaters equipped to apply F.E.P. or Teflon Coatings. The Moore Company had their aluminum hat presses coated and have reported that adhesion no longer is a problem.

Western Electric Company, Lee's Summit, Missouri: In the production of germanium semiconductors, Western Electric uses a number of precision microbalances. Building vibrations caused by stamping presses interfered with delicate weighings.

On learning from M.R.I. about the use of air bearing vibration isolators, Western Electric borrowed the M.R.I. air bearing assembly to try out

as a mount for their microbalances. The isolation was so satisfactory that Western Electric engineers have prepared specifications for their own design of balance platforms and have requested quotations from the Astro Space Laboratories Company of Huntsville.

Mueller, Trybus Associates, Omaha, Nebraska: During a plant visit M.R.I. suggested the use of beryllia ceramic heat sinks in place of the insulated aluminum heat sinks previously employed. Physical properties, cost and sources of supply were furnished.

Mueller, Trybus have adopted a molded beryllia part and are able to effect great savings in the number of man-hours needed to produce their electronic assemblies.

Union Wire Rope Division, Armco Steel Company, Kansas City, Missouri: The Union Wire Rope Company recently decided to enter the business of making large diameter dished tank heads. These heads would be up to 20 ft. in diameter and 1 in. thick. The company determined that a 4 million dollar facility would be required to make these heads by conventional hot spinning means.

M.R.I. furnished several NASA reports on explosive metal forming and put them in touch with one of the NASA contractors actively engaged in this type of work.

Union Wire Rope Company is now planning toward making these heads by explosive forming, since their preliminary estimates show this will save 1-1/2 to 2 million dollars over the proposed conventional method.

Paxton-Vierling Steel Company, Omaha, Nebraska: The Paxton-Vierling Steel Company expressed immediate interest in a high temperature foam insulation to apply to structural steel as a replacement for concrete in building construction. This foam insulation was employed in the protective coating of the astronaut escape vehicle used at the Atlantic Missile Range.

During the initial visit to Paxton-Vierling, M.R.I. left information on this insulation, including a sample and sources of supply. More recently the supplier, the Swedlow Company, has been asked by M.R.I. to supply Paxton-Vierling with larger samples and complete engineering information.

A major Kansas City manufacturer (who has asked that his interests be treated in confidence) approached M.R.I. relative to the use of the Arc Tunnel Heater as an adjunct to their present gas-fired heaters. We have ascertained for them that units of the power rating they need can be operated continuously and are capable of raising temperature of combustion gases by

several hundred degrees, thus assuring independent control over the gas flow rate and temperature. Technical representatives of this firm have had discussions with Westinghouse to explore a cooperative testing program.

Campbell Heating Company, Des Moines, Iowa: This producer of large furnaces and heating equipment learned from M.R.I. about the fiberglass weld backup tape used on Saturn tankage at the Marshall Space Flight Center. They are now evaluating samples of the tape. If the tape proves applicable to this firm's operations, it will allow a 50 per cent reduction in their total welding cost.

Lin-Mills, Perry, Oklahoma: M.R.I. first responded to a request from this plastics fabrication firm for data on the thermal insulation values of various flexible, thin fabrics, felts and foams capable of withstanding hospital autoclave sterilization. These leads enabled Lin-Mills to carry on and develop a specialty product for the hospital market.

On a subsequent call Mr. Harold Witcher, President, saw considerable market possibilities in the use of the Goddard devised floating honeycomb fastener in conjunction with their styrene bead-board products. M.R.I. is now attempting to determine the status of this development so that Lin-Mills can apply for license to employ this design concept.

Trend, Inc., Wichita, Kansas: Mr. Friedmen, President of Trend, saw immediate product opportunities for his firm to produce and market inflatable items patterned after the life raft and life vest developed at the Manned Spacecraft Center. In the absence of written description, Trend has borrowed the prototypes M.R.I. uses in the exhibits in order to study patterns and construction details. Matthew Radnofsky furnished information about the neoprene coated fabric, Velcro, Mylar-Nylon laminate and the adhesives employed in fabrication.

A recent call established that Trend is proceeding toward production on both the flotation vest and a modified raft.

While the electronics section of Trend was anxious to produce the compact video tape recorder developed by Goddard, they are dismayed that it has not been possible for NASA to determine the rights or patent status of this innovation.

Coleman Company, Wichita, Kansas: The Coleman Company is noted for its quality line of camping equipment. Since nylon rope is used extensively, they are faced with the problem of rope end attachments that do not slip.

M.R.I. suggested the use of an aluminum or brass swaged fitting, applied by magnetic metal forming. M.R.I. supplied technical information on magnetic metal forming and put Coleman in direct touch with General Dynamics Company, a commercial supplier of magnetic metal forming equipment. Coleman engineers are presently determining the suitability of magnetic swaging for their production use.

Flash Sheet Evaluation: The first set of 62 disclosures and Flash Sheets supplied by the Centers to the Office of Applications was given to M.R.I. for screening and evaluation.

From this work, we see that the Flash Sheet form will be extremely useful in disclosing and identifying potentially useful ideas. However, the information provided on the Flash Sheet is never complete enough to permit a thorough evaluation of the commercial value and importance of an idea.

We have, however, attempted to rank the ideas into three classes, largely according to the potential breadth of application:

1. Good inventions; widely useful,

2. Substantial innovations; fairly wide application, and

3. Innovations of highly limited or specialized application.

Further, we have attempted to divide each class into two basically different groups:

A. Innovations created to solve a space-related problem; frequently a problem not previously encountered. These ideas are different enough from the normal state-of-the-art that the nature of its features is more important than the quantitative performance values. The ultimate value of ideas in this group depends upon finding appropriate applications that can utilize these unique features. (A typical example of this group is the Digital Solar Aspect Sensor.)

B. Innovations representing substantial improvements in the state-of-the-art. Applications of ideas in this group are usually readily apparent, since somewhat similar concepts are already in use. The ultimate value of ideas in this group depends upon an engineering evaluation of the performance versus competing items. If the improvement is sufficient the innovation has great value. Economical considerations are more important for ideas

of this group than for group A. (A typical example of this group is the All Metal High Pressure Valve.)

The distinction between ideas of groups A and B is, we believe, more important than any judgement of the possible extent or breadth of application. This classification must be made because the next logical step in marketing is different for the two groups.

For group A ideas, some new use must be found that will take advantage of a solution to a problem not normally encountered. This is an inductive process.

For group B, the next step is to compare the performance obtained with the new idea against other similar items. This is an engineering analysis.

Eventually, ideas of both groups will need to have an economic evaluation for the use contemplated.

Flash Sheet Preparation: For the sake of uniformity, the ideas collected earlier by M.R.I. are now being transferred to the standard Flash Sheet form.

Meeting with Industrial Applications Advisory Committee: On June 26 representatives of M.R.I. met with the Stevenson Committee to report on the findings and progress of our regional program. One consequence of this meeting is that M.R.I. and other research institutes will assist in the evaluation and testing the usefulness of NASA ideas disclosed on Flash Sheets. This activity is tentatively expected to start in October.

Visit to Lewis Research Center: Three project engineers visited Lewis Research Center July 24, 25 and 26. With the help of Dr. Olson, the Applications Officer, we were able to meet and talk with a great number of persons directly concerned with research and development, as well as with the shop and facilities engineering groups. As a result of these discussions, we have identified 41 ideas having potential applications. Some of these ideas had previously been submitted as Flash Sheets; we are preparing sheets on all the new items.

Patent Office Search: Two engineers spent the week of August 6 to 10 in the Office of Patent Affairs. For each of the invention cases, we recorded information in the following typical form:

Case Number; 211

Source: Ames Research Center

Inventor: John Dimeff

Date: 1960

Status: Application Pending

Title: "Dynamic Sensor"

Short Description: The purpose of this invention is to provide a device which will measure the density of the gaseous environment or in the case when the composition and temperature of the gas are known, a device which will measure the pressure of a gaseous environment. The unit measures the gas pressure by obtaining the change in frequency of the dynamic system and relating it to the characteristics of the gases surrounding the diaphragm. It has been used in the Ames helium blow-down wind tunnel.

The descriptions were purposely kept short and free from functional details or claims which might, if publicized, impair the patentability of the idea.

During the next quarter we will determine the best ways of using this information to stimulate the licensing and working of NASA inventions by industry.

II. FUTURE PLANS

In the next quarter we plan to hold ASTRA meetings as follows:

Topeka, Kansas	5 September 1962
Tulsa, Oklahoma	17 September 1962
Minneapolis/St. Paul, Minnesota	16 and 17 October 1962
St. Louis, Missouri	24 and 25 October 1962

Davenport, Iowa	Week of 5 November 1962
Little Rock, Arkansas	November 1962
Lincoln, Nebraska	November 1962

Center Applications Officers are especially invited and encouraged to attend one of these meetings. Minneapolis and St. Louis should prove to be most interesting.

APPENDIX A

TYPICAL CONTACT REPORTS OF COMPANY VISITS

CONTACT REPORT

FROM: J. A. Houston (Name) ASTRA (Division) Date of Contact: 8-7-62
Date of Report:

COMPANY (Name and Division). . . Rouge Electronics (See Brochure)
Complete Address . . . Oklahoma City, Oklahoma
Telephone Number and Extension . . .

Persons Contacted	Title	Add to Mailing List
Mr. Watson	Chief Engineer	

Located in the Research Park Area.
Part of the University of Oklahoma Research / Industrial Effort.

Essential Information (attach second sheet if necessary)

A very alert and aggressive medium-sized electronic firm. Discussion lasted 1 1/2 hours, giving us a good look at their capabilities and problems.

Especially interested in:

(1) Patent lists (left one)
(2) Telemetry
(3) Miniature connectors
(4) Welding techniques
(5) Patent list on telemetry area
(7) New circuits coming out of Goddard.

Recommended Next Action (specify by whom)

Revisit when next in Oklahoma City.

Make selective mailings in areas 2, 3, 4, 6.

Evaluation (check one)
( ) Proposal Requested
( ) Good
( ) Fair
( ) Poor
( ) Unknown

Distribution
1. Sales File
2. Sales File (for Pres. & Adm. V.P. routing)
3. Technical Director
4. Division
5. Writer
6. Field Representative, if applicable _____
7. Other referrals, if applicable:

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Follow-up Date _____

CONTACT REPORT

FROM: Eldon Sneegas (Name) ASTRA (Division) Date of Contact: 6-26-62 Date of Report: 7-3-62

COMPANY (Name and Division). . . Davis Manufacturing Company
Complete Address . . . 1500 South McLean Boulevard - Wichita, Kansas
Telephone Number and Extension . . . AM 5-6251

Persons Contacted	Title	Add to Mailing List
Mr. B. F. Carpenter	Vice President, Manufacturing	Yes

Essential Information (attach second sheet if necessary)

The Davis Company makes a line of ditch diggers, small hoists and similar self-powered implements. At first, Mr. Carpenter was sure project ASTRA could not benefit his company. After touring the plant, he requested more information on: thread sealants, resistoflex couplings, hydraulic filters and fiberglass weld back-up tape.

NOTE: Mr. Carpenter attended the Wichita ASTRA meeting and came away feeling it was "too far out" for him. He seemed gratified to find that some of the ideas useful in solving space fabrication problems could be useful in his manufacturing work.

Recommended Next Action (specify by whom)

Await letter of inquiry.

Evaluation (check one)
( ) Proposal Requested
( ) Good
( ) Fair
( ) Poor
(x) Unknown

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Follow-up Date _____

CONTACT REPORT

FROM: Eldon Sneegas (Name) ASTRA (Division) Date of Contact: 6-28-62
Date of Report: 7-5-62

COMPANY (Name and Division). . . Precision Metalcraft, Inc.
Complete Address . . . 2853 South Hillside - Wichita, Kansas
Telephone Number and Extension . . . MU 2-4551

Persons Contacted	Title	Add to Mailing List
Mr. Robert C. Faris	President	Yes

Essential Information (attach second sheet if necessary)

Mr. Faris did not attend the Wichita ASTRA meeting because he felt it would be of no value to his company. He is critical of the size of the space budget, but agreed to listen to some results of money already spent. His interest mounted during our 1 1/2 hour discussion. He requested information on: Dyna-Pak, Fusion Welding, Patents and Frangible Tube Shock Absorbers. At the conclusion of our talk, Mr. Faris said he is a personal friend of Mr. Webb, the NASA Administrator, and that he will write to Mr. Webb to express his appreciation for the ASTRA program.

"It is the first good thing I've seen to come out of the Kennedy administration."

Recommended Next Action (specify by whom)

Await letter request.

Send information asked for.

Evaluation (check one)
( ) Proposal Requested
( ) Good
( ) Fair
( ) Poor
(x) Unknown

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7. Other referrals, if applicable:

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CONTACT REPORT

FROM: Howard M. Gadberry (Name) ASTRA (Division) Date of Contact: Date of Report:

COMPANY (Name and Division). . . Track Service Company
Complete Address . . . Box 7291 - Oklahoma City, Oklahoma
Telephone Number and Extension . . .

Persons Contacted	Title	Add to Mailing List
Mr. C. J. Royer	President	

Essential Information (attach second sheet if necessary)

Firm services and rebuilds crawling tracks of earth moving equipment tractors. Have developed automatic welding equipment to build up worn plates and resurface. Uses submerged arc process. Consumes 70,000 pounds of flux/mo at 12 cents per pound. Would like to be able to melt and water quench for reclamation. Wants information on small size glass melting furnace.

Send Index of Technical Capabilities and Interests.

Send information on electro-slag process for welding heavy sections of steel.

Recommended Next Action (specify by whom)

Send information requested.

Look into Arcos Process.

Evaluation (check one)
( ) Proposal Requested
( ) Good
(x) Fair
( ) Poor
( ) Unknown

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7. Other referrals, if applicable:

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CONTACT REPORT

FROM: J. A. Houston (Name) — ASTRA (Division)

Date of Contact: 6-29-62
Date of Report: 7-3-62

COMPANY (Name and Division). . . Trend, Inc.
Complete Address . . . 1236 North Mosley - Wichita, Kansas
Telephone Number and Extension . . . AM 2-1401

Persons Contacted	Title	Add to Mailing List
M. Freidman	President	Yes
C. Macy	Executive	"

Essential Information (attach second sheet if necessary)

Trend, Inc. is a group of associated merchandising and manufacturing enterprises. For instance, there is a Trend Store for womens' wear, another for swim wear, another for furniture. And there are to be future endeavors.

Thus many of the NASA/ASTRA items were of interest both in an immediate and future sense. The discussions continued until 10:00 P.M. at the motel.

Mr. Freidman seems pretty aggressive in that a telegram was sent to Office of Applications inquiring about licensing on the Video Tape Recorder and the Life Raft.

The main items of interest, for immediate production by Trend, were the Life Raft, Video Tape Recording Head, Floating Fastener and the Frangible Tube.

Recommended Next Action (specify by whom)

Write a letter to NASA, Washington, to clarify status on Tape Recorder, Raft and Floating Fastener.

Evaluation (check one)
( ) Proposal Requested
(x) Good
( ) Fair
( ) Poor
( ) Unknown

Distribution
1. Sales File
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4. Division
5. Writer
6. Field Representative, if applicable _____
7. Other referrals, if applicable:

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CONTACT REPORT

FROM: J. A. Houston (Name) ASTRA (Division) Date of Contact: 8-7-62 Date of Report: 8-7-62

COMPANY (Name and Division) . . . Southwest Electric Company
Complete Address . . . Oklahoma City, Oklahoma
Telephone Number and Extension . . .

Persons Contacted	Title	Add to Mailing List
Mr. J. D. Potter	Chief Engineer	Yes

(Mr. George Phares, Secretary-Treasurer, was on vacation)

Essential Information (attach second sheet if necessary)

Main interests were allied with their electrical manufacturing problems.

1. Temperature Indicating Paint
2. Temperature Sensing Devices
3. Wire Coating
4. Corrosion Protection
5. Silicon Controlled Rectifiers
6. Pert and Pert/Cost
7. Patent List

Mr. Potter was very enthusiastic about the prospects of cooperating with the ASTRA project. Almost any of the topics from 1 - 7 could have served as a basis, by Mr. Potter, for further needs of his company. With the promised material received by Mr. Potter, he will review applicable areas. Meantime, the engineering section is collecting questions to be posed to ASTRA.

Recommended Next Action (specify by whom)

Package Information (Houston)

Evaluation (check one)
( ) Proposal Requested
(x) Good
( ) Fair
( ) Poor
( ) Unknown

Distribution
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6. Field Representative, if applicable _____
7. Other referrals, if applicable:

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Follow-up Date _____

CONTACT REPORT

FROM: Eldon Sneegas (Name) ASTRA (Division) Date of Contact: 6-26-62 Date of Report: 7-5-62

COMPANY (Name and Division). . . Globe Engineering Company
Complete Address . . . 1539 South St. Paul Street - Wichita, Kansas
Telephone Number and Extension . . . WH 3-1266

Persons Contacted	Title	Add to Mailing List
Mr. Albert H. Nelson, Jr.	Owner	Yes
Mr. R. Wayne Colburn	Engineer	"

Essential Information (attach second sheet if necessary)

This company does sub-contract work for Boeing, Cessna, etc. in the field of sheet metal fabrication, tube bending, metal spinning and tube swaging. This company was not represented at the Wichita ASTRA meeting because they felt it would not be applicable to their business. After a 30-minute discussion, Mr. Nelson enthusiastically requested further information on: explosive, magnetic and spark discharge metal forming, electron beam welding, fiberglass back-up tape, U. S. Pat. No. 2,926,123 and any information we may have on means of improving the heat transfer coefficient of stainless steel used in aircraft heaters.

Recommended Next Action (specify by whom)

Await letter request.

Evaluation (check one)
( ) Proposal Requested
( ) Good
( ) Fair
( ) Poor
(x) Unknown

Distribution
1. Sales File
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4. Division
5. Writer
6. Field Representative, if applicable _____
7. Other referrals, if applicable:

MRI 43 Rev 7-61

Follow-up Date _____

CONTACT REPORT

FROM: J. A. Houston (Name) ASTRA (Division) Date of Contact: 8-8-62 Date of Report: 8-8-62

COMPANY (Name and Division) . . . FLINCO
Complete Address . . . 1748 N. E. 10th Street - Oklahoma City, Oklahoma
Telephone Number and Extension . . . GA 4-44357

Persons Contacted	Title	Add to Mailing List
Mr. C. F. Fletcher	President	

Essential Information (attach second sheet if necessary)

Explained ASTRA program. This firm (150 employees) makes a large line of precision mechanical devices -- pumps, meters, air compressors, battery chargers (see brochure he furnished).

Mr. Fletcher's main interest was in possible products which he could add to his line as a proprietary item. A large spectrum of possible space-derived products were discussed for Mr. Fletcher's consideration. We suggested to Mr. Fletcher that a possible market opportunity exists for his firm in fabricating air bearing isolation mounts for precision equipment such as gauges, balances, etc. This would tie in very nicely with his existing line of small pumps and compressors.

Recommended Next Action (specify by whom)

Send Index.

Await specific questions.

Evaluation (check one)
( ) Proposal Requested
( ) Good
( ) Fair
( ) Poor
(x) Unknown

Distribution
1. Sales File
2. Sales File (for Pres. & Adm. V.P. routing)
3. Technical Director
4. Division
5. Writer
6. Field Representative, if applicable _____
7. Other referrals, if applicable:

MRI 43 Rev 7-61

Follow-up Date _____

APPENDIX B

NEWS COVERAGE OF FOLLOW-UP VISITS

Joplin, Missouri
Carthage, Missouri
Oklahoma City, Oklahoma
Norman, Oklahoma

The Joplin Globe

ALFRED HARRISON ROGERS
President — 1910 - 1920

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Published every morning except Monday by The Joplin Globe Publishing Company, 117 East Fourth street, Joplin, Missouri, under the act of March 3, 1879.

Subscription Rates—By mail in first and second postal zones, $12.00 per year, morning and Sunday; beyond second zone, $16.00 per year. By carrier, 35c per week.

Opportunity Still Knocking

The National Aeronautics and Space Administration (NASA) is following through on its offer of last April to give the six-state midwestern area, including the Joplin district, first call on commercial adaptation of new products and processes emerging from the technology of the space age.

This is the significance of the visit to this area this week by two consultants of Midwest Research Institute of Kansas City, which holds a contract with NASA to disperse these new products into the industrial economy of the Midwest for development. It is a call-back on industries that have expressed interest in development of this new technology commercially, encouraging them to get busy. The offer is free.

Midwest, itself expanding with a large staff of scientists and technicians, is interested in supplying knowledge and assistance to industries large and small which are able to add any of these new products to their lines.

We would think this is a golden opportunity to enlarge the industrial diversification and create more jobs in the Four-State district in the further expansion and stabilization of the regional economy. It does, of course, require new investment capital and faith in the future.

Due to present labor unrest, with work stoppages and threats of disruptions, some questions now may be raised as to the labor force meeting its responsibilities in this field of new opportunity. But we hope and believe this will be only temporary. For past performance over the long pull indicates a much larger degree of labor consistency and responsibility throughout the Joplin district.

THE JOPLIN GLOBE
Joplin, Missouri

July 26, 1962

New Techniques, Tools Developed In Space Work To Be Explained Here

Information gained from National Aeronautics and Space Administration research will be explained free of charge this week by representatives of Midwest Research Institute of Kansas City to Joplin district businessmen.

Here until Friday on a follow-up to the first Missouri regional conference on application of space technology to advancement of business and industry, held in Joplin April 17, are James A. Houston and Al Kimmel, MRI consultants.

Dr. Charles Kimball, MRI president, who addressed about 80 businessmen and industrialists attending the April 17 conference, emphasized then that the institute planned to communicate ideas to business and industry by visits to individual plants and by answering specific inquiries for developments of space research which are particularly applicable to individual industries.

Houston said Monday that he and Kimmel are here for that purpose. "Some industries attending the April conference in Joplin filled out indexes of their technical capabilities and interests of their companies in order to receive space-derived ideas and we are here to give them those ideas," Houston pointed out.

"All persons interested in learning of new techniques, new concepts and new tools of management that have resulted from NASA's 'ASTRA' program are urged to make appointments by calling us," Houston said. "We'll make appointments to confer with large or small businesses until as late as 9 o'clock each night if they will contact us at the Bob Cummings motor hotel, MA 4-7700, extension 135. The switchboard operator there will take any messages and we will return those calls," Houston stated.

"Up for grabs to industry are new metal forming techniques, welding techniques, new materials, NASA's documentation on the latest state of the art of electronics, program management, such as PERT and PERTCOST, new wire-wrap methods, and NASA's soldering techniques for extreme reliability," Houston enumerated.

"In addition NASA patents on numerous technical areas are available to any business and individual who can adapt them to their own use," he concluded.

The "ASTRA" program, to which Houston referred, stands for "Applied Space Technology—Regional Advancement." The ASTRA program is being directed by MRI for NASA to stimulate commercial use of space information in Missouri, Iowa, Nebraska, Kansas, Oklahoma and Arkansas which will result in industrial development of these six midwestern states.

Houston said Monday that he will visit industries in Neosho and Carthage today returning to Joplin tonight. He will be joined by Kimmell, another member of the ASTRA project task force, for conferences here the remainder of the week.

"If any businessman or industrialist is unable to talk with us while we're here," Houston said, "they may write ASTRA Project, Midwest Research Institute, 425 Volker boulevard, Kansas City 10, and request information."

The Press
Carthage, Missouri

July 27, 1962

MRI Agent Here In Interest NASA Space Program

James A. Houston, representative from Midwest Research Institute, Kansas City, was here today on a follow up visit for the NASA meeting held in April in Joplin.

Mr. Houston is prepared to assist individuals or firms interested in exploring some of the economic advantages of the new techniques, new concepts and new tools of management coming out of the NASA space program.

He will be available until Friday and will be happy to discuss application of the new developments in connection with their own operations. Mr. Houston invites them to contact him while here.

Interested manufacturers may contact him through E. L. Dale of The Press, FL 8-2191.

Or, if they are unable to confer with Mr. Houston they are urged to contact Astra Project, Midwest Research Institute, 425 Volker Boulevard, Kansas City 10, Mo.

OKLAHOMA CITY TIMES
August 6, 1962

New Business Ideas Offered Oklahomans

By Gilbert Hill

Gadgets and ideas that could make millions for alert manufacturers and put thousands more to work in Oklahoma are being offered free to small business firms here this week.

James A. Houston and H. M. Gadberry, staff members of the Midwest Research Institute, Kansas City, are calling on firms that listed their facilities at an Oklahoma City conference in March.

"But we're looking for other firms, in almost any business you can name, that are willing to expand their lines with related or new products," Houston said.

Down to Business

"We are no longer talking in vague terms. We have lists of patents with us. We can supply detailed working drawings to interested and qualified people. And we'll work with anyone interested."

The two men are at the Downtowner Motel. They have interested firms to call on in Oklahoma City, Durant, Tulsa and Ponca City.

Midwest Research is engaged in a special project of the National Aeronautics and Space Administration to turn products produced by government space research into general and government use.

A New Paint

One development is a paint that won't chip or crack even when the aliminum pipe covered with it is beaten and bent.

Another is a gadget that will slow down and stop a falling object without a jar. It also can be used to measure the extent of the blow that a shipment has taken in a freight car, for instance.

There are rechargeable flash lights and wiring devices that can be used without electric power to take the place of soldering.

Plenty of Ideas

Houston said there "are literally thousands of new ideas — and that's no exaggeration — with private and commercial applications which have come from space research. We're finding more of them every day."

Firms that are being called on are those which filled out "technical registers," during last spring's meetings in which they listed production facilities, present products and market area, and training of management, engineering, and production departments.

Products have been found for these firms to study.

"In some instances we find little interest, but in others we've had executives pick up the telephone and call Washington to get an exclusive license to manufacture specific items," said Houston. "Such licenses are available."

Research, to speed up the nation's space program, is the basis of the new ideas and products. Many of the items do have specific applications in space and other even more valuable applications in private commerce.

THE NORMAN TRANSCRIPT
Norman, Oklahoma

Thursday, August 9, 1962

Space Ideas Offered To Norman Industry

Many materials and ideas developed for the aerospace program are adaptable to industries on earth, according to two researchers visiting in Norman today.

Howard M. Gadberry and James A. Houston, Midwest Research Institute, Kansas City, Mo., are attempting to sell Norman business and industrial leaders on new methods and suggestions for technical improvement. The institute is under contract with the National Aeronautics and Space Administration (NASA) for the transfer of space developments to industry.

Gadberry and Houston are offering a list of patents and new ideas to stimulate industry in a six-state area (Oklahoma, Arkansas, Kansas, Iowa and Nebraska). The project is entitled Applied Space Technology-Research Advancement (ASTRA).

"Aerospace technical advancements are producing new materials, processes, products and techniques that could be used by practically any level of business," Gadberry said. "People from NASA who are interested in area development and industry growth are assisting us in this operation.

"We have a contract with NASA to provide Midwest manufacturers with technical information that will be of use to them in their own business operations. Our intent is to improve the technical capabilities of firms, to allow employment of more technical skills and people and to reduce the outward migration of locally trained people.

"NASA is producing many new materials that are the backbone of industry here on earth. We are surveying the technical developments made in the space program and putting them in forms and language that is understandable and applicable to businessmen."

Houston said the basic purpose of the institute is to "repackage" a space idea to improve an operation — allowing the idea to be readily utilized.

Types Listed

"One may ask, 'How does a manufacturer get information of a technical advancement he may not even know exists?' Our purpose is to get him this information," Houston said. "With so many exciting developments, we run the whole spectrum of technical advancements."

Gadberry said there are four kinds of technical information available at the Midwest Research Institute. They include new space products that may be useful on earth; new materials to improve productivity and decrease costs; a wide variety of processes, techniques and fabrications, and new management aids.

"If a manufacturer has a problem, there may be the possibility that the solution already exists in aerospace activity," Gadberry said. "We are solving many problems which may have their origins in space.

"This Midwest program is very important to the United States. We've got to maintain our technology and improve the technical use of our energy in order to compete with other countries in the future."

"Reception Encouraging"

The Norman visit by Gadberry and Houston is a follow-up of an industry meeting held in Oklahoma City in March. They said they are talking with businessmen they met then but want to meet with others who did not attend.

"We have had a very encouraging reception from businessmen here," Gadberry said. "They have been very receptive to the information we have given them and appear to be aggressive toward the program."

Houston said those who desire information about the project may write: ASTRA, Midwest Research Institute, 425 Volker Blvd., Kansas City, 10, Mo.